VERDE RIVER WATERSHED

The Verde River watershed is located in north-central Arizona. The bulk of the watershed is within the boundary of the Verde River groundwater basin (Figure 4). The uppermost parts of the Granite Creek drainage and Del Rio Springs, tributary to the Verde River, are located within the Prescott AMA; the last 25 miles of the Verde River south of Bartlett Reservoir are located within the Phoenix AMA.

The Verde River drains an area of approximately 6,188 square miles and traverses a distance of about 140 miles from Sullivan Lake Dam near Paulden, to its confluence with the Salt River. The river drains eastward from Sullivan Lake Dam to Perkinsville, then southeastward to its confluence with Fossil Creek where it continues southward until it joins with the Salt River.

STREAMFLOW CHARACTERISTICS

The Verde River is intermittent from Sullivan Lake Dam to the Granite Creek confluence, a distance of about 3 miles; perennial flow is maintained from this confluence to where it joins the Salt River. The major perennial tributaries drain the area north and east of the Verde River and flow in a southwesterly direction toward the Verde River. Groundwater discharge maintains perennial flow in these tributaries and in the Verde River. Perennial stream reaches in the Verde River watershed are listed in Table 4 and displayed in Figure 4.

TABLE 4
SELECTED PERENNIAL STREAM REACHES IN THE VERDE RIVER WATERSHED

Perennial Stream Reaches	Length (miles)
Sycamore Creek (north of Cottonwood)	2
Oak Creek	33
Wet Beaver Creek	20
West Clear Creek	37
Fossil Creek	9
East Verde River	40
Sycamore Creek (north of Horseshoe Lake)	2
Deadman Creek	5
Sycamore Creek (at Fort McDowell - 3 reaches)	22
Source: Brown and others, 1981	

Eight streamgaging stations have been operated by the U.S. Geological Survey in the Verde River watershed. Annual flows for these gaging stations are presented in Table 5 and displayed on Figure 5.

TABLE 5
ANNUAL FLOWS FOR USGS STREAMGAGING STATIONS IN THE VERDE RIVER WATERSHED

Station Name	Station Number	Period of Record	Mean Annual Flow (ac-ft)	Median Annual Flow (ac-ft)	Record Annual High Flow (ac-ft)	Record Annual Low Flow (ac-ft)

Williamson Valley Wash near Paulden	9502800	1965-1985	11,580	4,550	45,600	1,160
Verde River near Paulden	9503700	1964-1990	29,680	20,990	106,400	17,370
Verde River near Clarkdale	9504000	1916 1918-1920 1966-1990	136,070	113,640	324,260	59,350
Oak Creek near Cornville	9504500	1941-1945 1949-1990	63,690	52,580	173,710	21,710
Wet Beaver Creek near Rimrock	9505200	1962-1982	25,330	22,220	74,550	5,570
Red Tank Draw near Rimrock	9505250	1958-1978	5,210	3,390	26,780	29
Rattlesnake Canyon near Rimrock	9505300	1958-1980	6,510	4,420	21,710	101
Dry Beaver Creek near Rimrock	9505350	1961-1990	32,570	20,920	100,610	800
West Clear Creek near Camp Verde	9505800	1966-1990	47,050	34,740	144,040	11,580
Verde River near Camp Verde	9506000	1935-1945, 1989	318,000	221,480	767,230	115,080
East Verde River Diversion from East Clear Creek	9507580	1965-1990	9,990	9,700	18,240	3,110
East Verde River near Childs	9507980	1968-1989	51,390	32,860	133,900	10,130
Wet Bottom Creek near Childs	9508300	1968-1989	10,860	6,890	29,680	330
Verde River below Tangle Creek, above Horseshoe Dam	9508500	1946-1989	404,600	306,170	1,237,700	136,800
Verde River below Bartlett Dam	9510000	1904-1990	487,600	390,130	1,569,200	122,320
Source: U.S. Geological Survey, 1992; National Water Information System; McGavock and others, 1986						

RESERVOIRS

Flows from the Verde River are regulated at two reservoirs operated by the Salt River Project, Horseshoe Lake and Bartlett Lake. These reservoirs provide incidental flood control and water for agricultural, industrial, and municipal use in the Phoenix area. Present storage capacities of these reservoirs are as follows:

Reservoirs	
Reservoir	**Storage Capacity (acre-feet)**
Horseshoe	131,400
Bartlett	178,200

Combined pan evaporation data for both reservoirs were averaged for the years 1954-1985 and then appor8tioned by each reservoirs' relative surface area to obtain the average pan evaporation for each reservoir. Relative surface area and average evaporation are summarized in Table 6.

TABLE 6
ANNUAL EVAPORATION OF THE VERDE RIVER LAKES

Lake	Relative Surface Area	Avg. Evaporation (acre-feet)
Horseshoe	10.2%	11,300
Bartlett	10.0%	11,000

Source: Salt River Project, 1987

WATER QUALITY

Surface water in the Verde Valley is used mostly for irrigation purposes. The water quality generally is well-suited for this use. During low flows, the dissolved solids concentrations generally increase in the downstream direction because of the increased levels in groundwater from the Verde Formation. This is especially evident in the southern part of the Verde Valley (Owen-Joyce and Bell, 1983). High sodium levels occur in the Verde River downstream from Camp Verde. Turbidity is a persistent problem partly due to inadequate range management.

Mining operations are believed to be the cause of boron level exceedances near Perkinsville and mercury exceedances near Fossil Creek and occasionally near Clarkdale and Tangle Creek (Arizona Department of Environmental Quality, 1990).

Drainage from the United Verde Mine leach operations flows into Bitter Creek and a tributary stream. Water at the mouth of Bitter Creek contained high concentrations of sulfate, dissolved solids, copper, zinc, manganese, and iron (Owen-Joyce and Bell, 1983). Elevated levels of ammonia and selenium also occasionally occur (Arizona Department of Environmental Quality, 1990).

In Oak Creek, turbidity, ammonia and high levels of boron have been measured below the West Fork. Turbidity, ammonia, nutrients and fecal coliform exceedances have been recorded in Dry Creek which feeds into lower Oak Creek. These water-quality problemsare attributed to land development, on-site wastewater systems, and recreation in the area (Arizona Department of Environmental Quality, 1990).